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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,397	02/21/2002	Masakazu Sugaya	520.41238X00	5607

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EXAMINER

HUGHES, JAMES P

ART UNIT PAPER NUMBER

2881

DATE MAILED: 06/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/078,397

Applicant(s)

SUGAYA ET AL.

Examiner

James P Hughes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9 and 10 is/are rejected.
- 7) ☒ Claim(s) 1-8 and 11-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 24 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The objections to the claims and the specification in the Office Action dated December 23, 2002 have been overcome by applicant's amendments dated March 24, 2003.
2. Applicant's replacement abstract is acknowledged and accepted.
3. Applicant's request for documentary proof of examiner's Official Notice (pg. 17 of amendment dated March 24, 2003) cannot be fulfilled because Official Notice was not explicitly or implicitly taken in the art rejection under USC 103 at item 5 spanning pages 5 and 6 of the Office Action dated December 23, 2002.
4. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on March 24, 2003 have been accepted. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected. Corrections must be made in accordance with the instructions below.

### ***Claim Objections***

5. Claims 1-21 are objected to because of the following informalities. The term "electric conductivity beam(s)" in the claims renders them indefinite because it does not clearly state what is claimed. The present invention and claims are directed to a physical beam, not a beam of charged particles, which is well supported in the specification. However, one of ordinary skill in

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the art may very likely interpret the term "beam" as referring to a beam of charged particles such as electrons or ions, as is the much more common usage in the art than *physical* beams. The probability of this possible miss-interpretation increases with the addition of the grammatically awkward phrase "electric conductivity", which can be used interchangeable in reference to a beam of charged particles or a physical beam. Perhaps the phrase "electric conductivity" should be replaced with the phrase – electrically conductive – in the following locations: claim 1, line 1; claim 2, line 1; claim 3, line 6; claim 4, line 6; claim 6, lines 4 and 5; claim 8, lines 4 and 5; claim 9, line 8; claim 10, lines 7 and 8; and the first line of claims 12-21. The phrase "electric conductivity" is appropriately used in claim 1 (line 4), claim 3 (line 7), and claim 4 (line 7). Claims 5 and 11 are objected to because they inherit the deficiencies of claim 4, which they are dependent. Claim 7 is objected to because it inherits the deficiencies of claim 6, which it is dependent. Appropriate correction is required.

6. Claims 8-10 are objected to because of the following informalities. The pluralization of "beams" is not grammatically correct in: claim 8, line 5; claim 9, line 9; claim 10, line 8. The claims recite "a top of *an* electric conductivity *beams*" (emphasis added). This phrase in the claims is directed to a single beam, not a plurality of beams, thus "beam" in the singular is appropriate. Perhaps the second occurrence of the word "beams" in line 5 of claim 8, the word "beams" in line 9 of claim 9, and the word "beams" in line 8 of claim 10 should each be replaced with the word – beam –. Appropriate correction is required.

7. Claim 11 is objected to because an informal amendment was made without proper authorization. Claim 11 was amended (in blue ink) replacing the word "any" in the 2<sup>nd</sup> line of

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the claims with – at least one –. This amendment was not properly authorized (initialed) or identified by applicant. Applicant is kindly requested to submit a formal amendment.

8. Claims 18 and 19 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 18 and 19 recite “wherein the thickness of said minute micro-sample is take into account in setting a width of said deep cut so that said branch beams are separated from each other by the distance which is smaller than the thickness of said minute micro-sample” in lines 4-7 of both claims. These limitations do not further limit the recitation of “said branch beams are separated from each other by a distance which is smaller than a thickness of a minute micro-sample ...” in lines 6-7 of claim 1 because claim 1 has already established the limitation that distance between the branch beams is less than the thickness of the minute micro-sample.

9. Claims 20 and 21 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 20 and 21 recite “wherein the thickness of said minute micro-sample is take into account in setting a width of at least one deep cut of said two deep cuts so that said branch beams are separated from each other by the distance which is smaller than the thickness of said minute micro-sample” in lines 4-7 of both claims. These limitations do not further limit the recitation of “said branch beams are separated from each other by a distance which is smaller than a thickness of a minute micro-sample ...” in lines 6-7 of

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claim 1 because claim 1 has already established the limitation that distance between the branch beams is less than the thickness of the minute micro-sample.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi et al. (JP 03-154784, translation). Onishi teaches a method and apparatus for specimen fabrication comprising, a charged particle beam source – including an optical means for converging a charged particle beam – (30) that irradiates a focused ion beam onto a specimen (41) mounted a specimen stage (40), and a sample hold system having a system holding a minute micro-sample at a top of electrically conductive branch beams (20) which are formed at a top of an electrically conductive beam. (Page 8, lines 1-15)

However, Onishi does not teach the sample hold system mounted obliquely above, within a range of 15 – 65 degrees relative to, the specimen stage surface.

It would have been obvious to one of ordinary skill in the art at the time of the invention to mount the sample hold system of Onishi obliquely above, within a range of 15 – 65 degrees relative to, the specimen stage surface because this is a common well known arrangement in the art. This is shown by, at least: Shofner (6,300,631) figure 4; Shichi et al. (2002/0079463) sample hold system (3) in figure 4; and Toduda et al. (2002/0050565) sample hold system (72) in figure 3.

Regarding claim 10, Onishi does not explicitly mention an objective lens in the focused ion beam optical system. However, an objective lens is inherent in a focused ion beam optical system, and is shown in Shofner (6,300,631) in col. 3, lines 17-39)

***Allowable Subject Matter***

11. Claims 1-8 and 11-21 would be allowable if amended to overcome the objections in items 5-9 of this Office Action. The following is a statement of reasons for the indication of allowable subject matter.

Claims 1, 3, 4, and 6 are allowable because the prior art of record fails to teach or fairly suggest an apparatus, method, or means for an electrically conductive beam used for separating and extracting a minute micro-sample from a specimen substrate in vacuum space (or specimen fabrication), wherein the beam comprises, in combination with the other recited limitations of the claims, a plurality of branch beams having an electric conductivity formed at a tip of said beam; wherein said branch beams are separated from each other by a distance which is smaller than a thickness of a minute micro-sample to be held between said branch beams when said beam is moved in the direction of the minute micro-sample and said branch beams being forcibly spread by the minute micro-sample so that the minute micro-sample is held by a resiliency force of said branch beams. Claims 2 and 12-21 are allowable by virtue of their dependence on claim 1. Claims 5 and 11 allowable by virtue of their dependence on claim 4; and claim 7 is allowable by virtue of its dependence on claim 6.

Claim 8 is allowable because the prior art of record fails to teach or fairly suggest an apparatus, method, or means for specimen fabrication, comprising, in combination with the other

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recited limitations of the claim, holding the minute micro-sample at the top of electrically conductive branch beams which are formed at a top of an electrically conductive beam; extracting the minute micro-sample held by a restoring force of said branch beams from the specimen.

### *Conclusion*

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dawes (WO 99/17103) teaches a specimen fabrication method and apparatus employing an beam – mechanical tweezers – (30) with a plurality of branch beams formed at a top of said beam for extracting a minute micro-sample from a specimen substrate on a stage in a vacuum atmosphere, wherein said minute micro-sample is held by a restoring force of said branch beams. However, as Dawes is silent on the material composition, thus conductivity, of the beam (30).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P Hughes whose telephone number is (703) 305-5675. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached on (703) 308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.




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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

James P. Hughes  
Patent Examiner  
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JK

May 8, 2003

  
JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
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